WHAT IS CLAIMED IS:

1. A semiconductor device tester including electron beam irradiation means for irradiating a test sample to be tested with electron beam while scanning sad sample therewith and current measuring means for measuring current generated in said sample by the electron beam irradiation, said semiconductor device tester comprising:

memory means for storing variations of current values measured for a plurality of test samples by said current measuring means while moving an irradiation position by said electron beam irradiating means correspondingly to the irradiation positions as current waveforms; and

comparator means for comparing the current waveforms obtained for the plurality of said test samples and stored in said memory means and, when a difference between the current waveforms exceeds a predetermined value, outputting an information related to the position on said one test sample at which the difference exists.

2. A semiconductor device tester as claimed in claim 1, wherein said memory means stores current waveforms of two test samples on one wafer and said comparator means compares the current waveform of one of said two test samples with the current waveform of the other test sample.

3. A semiconductor device tester as claimed in claim 1, wherein said electron beam irradiation means sets a width of an electron beam to a value substantially equal to a diameter of a contact hole formed in said test sample, and set the electron beam such that, after the electron beam scans said test sample along a scan line, the electron beam scans said test sample along a next scan line deviated from said scan line in a direction perpendicular to the scan

line by a value equal to the width of the electron beam.

4. A semiconductor device tester as claimed in claim 1, wherein said electron beam irradiation means sets a width of an electron beam to a value smaller than a diameter of a contact hole formed in said test sample, and set the electron beam such that, after the electron beam scans said test sample along a scan line, the electron beam scans said test sample along a next scan line deviated from said scan line in a direction perpendicular to the scan line by a value substantially equal to the diameter of said contact hole.

5. A semiconductor device tester as claimed in claim 1, wherein electron beam irradiation means sets a width of an electron beam to a value wide enough to simultaneously cover a plurality of contact holes formed in said test sample, and set the electron beam such that, after the electron beam scans said test sample along a scan line, the electron beam scans said test sample along a next scan line deviated from said scan line in a direction perpendicular to the scan line by a value equal to the diameter of the width of the electron beam.

6. A semiconductor device tester as claimed in claim 1, wherein electron beam irradiation means sets a width of an electron beam such that the electron beam irradiates an area containing a plurality of contact holes formed in said test sample, and set the electron beam such that, after the electron beam scans said test sample along a scan line, the electron beam scans said test sample along a next scan line deviated from said scan line in a direction perpendicular to the scan line by a value equal to the width of the electron beam.

7. A semiconductor device tester as claimed in claim 1, wherein said electron beam irradiation means includes main scan means for scanning the

test sample with electron beam by moving the test sample and sub scan means for deflecting the electron beam to a direction different from a main scan direction during the scanning by said main scan means.

8. A semiconductor device tester as claimed in claim 4, wherein said comparator means includes means for comparing instantaneous current values measured at positions intermediate between rising edges and falling edges of current waveforms generated by certain circuit patterns on a plurality of test samples.

9. A semiconductor device tester as claimed in claim 3 or 4, wherein said comparator means includes means for integrating current flown from a rising edge to a falling edge of a current waveform generated by a certain circuit pattern on the test sample, divider means for dividing a result of integration from said integrating means by a distance between the rising edge and the falling edge of the current waveform and average value comparator means for comparing the quotient obtained by said divider.

10. A semiconductor device tester as claimed in claim 6, wherein said comparator means includes integrated value comparator means for integrating current waveforms corresponding to identical circuit pattern positions and comparing the integrated current values.

11. A semiconductor device tester as claimed in claim 1, further comprising means for frequency-analyzing current waveform measured while moving an electron beam irradiating position and means for grouping positions at which the current waveforms are obtained every area having identical frequency component.

12. A semiconductor device tester as claimed in claim 10, further comprising means for setting, every grouped area, a test method correspondingly to the frequency component.

13. A semiconductor device tester as claimed in claim 1, wherein said comparator means includes means for calculating a position intermediate between a rising edge and a falling edge contained in a current waveform as a center position of a contact hole and means for comparing two center positions of two contact holes, which are calculated for two test samples, to obtain a relative position.

14. A semiconductor device test method for determining the quality of a semiconductor device by using current generated in a test sample when irradiated with electron beam, said semiconductor device test method comprising the steps of:

irradiating a first test sample with electron beam having a rectangular cross section, a longer side of which is substantially equal to a diameter of a contact hole formed in the first test sample, while scanning the electron beam in a scan direction perpendicular to a direction of the longer side, moving the scan position by a distance equal to the diameter of the contact hole in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the first test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a first current waveform;

irradiating a second test sample having an identical circuit pattern to a circuit pattern of the first test sample with electron beam having a rectangular cross section, a longer side of which is substantially equal to a diameter of a contact hole formed in the first test sample, while scanning the electron beam

in the scan direction, moving the scan position by a distance equal to the diameter of the contact hole in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the second test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a second current waveform; and

comparing the first current waveform with the second current waveform and, when there is a difference exceeding a predetermined value between the first and second current waveforms, extracting coordinates of a position corresponding to the difference.

15. A semiconductor device test method as claimed in claim 14, wherein, every time when the main scan of electron beam proceeds in a first direction by a distance corresponding to the diameter of the contact hole contained in the test sample, a constant amount of sub scan is performed in a second direction different from the first direction or a third direction opposite to the second direction.

16. A semiconductor device test method as claimed in claim 14, wherein at least one of the first and second current waveforms is frequency-analyzed and the positions at which the current waveforms are acquired are grouped every area having same frequency component.

17. A semiconductor device test method as claimed in claim 16, wherein a test method for every grouped area is set according to the frequency component thereof.

18. A test method of a semiconductor device, using current generated in a

test sample with electron beam irradiation, the test method comprising the steps of:

irradiating a first test sample with electron beam having a width smaller than a diameter of a contact hole formed in the first test sample, while scanning the electron beam in a constant direction, moving the scan position by a distance equal to the diameter of the contact hole in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the first test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a first current waveform;

irradiating a second test sample having an identical circuit pattern to a circuit pattern of the first test sample with electron beam having a rectangular cross section, a longer side of which is substantially equal to a diameter of a contact hole formed in the first test sample, while scanning the electron beam in the scan direction, moving the scan position by a distance equal to the diameter of the contact hole in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the second test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a second current waveform; and

extracting and comparing instantaneous current values at center positions between rising edges and falling edges of the first and second current waveforms corresponding to the identical circuit patterns and, when there is a difference exceeding a predetermined value between the instantaneous values, extracting coordinates of a position corresponding to the difference.

19. A test method of a semiconductor device, as claimed in claim 18, wherein, every time when the main scan of electron beam proceeds in a first direction by

a distance corresponding to the diameter of the contact hole contained in the test sample, a constant amount of sub scan is performed in a second direction different from the first direction or a third direction opposite to the second direction.

20. A test method of a semiconductor device, using current generated in a test sample with electron beam irradiation, the test method comprising the steps of:

simultaneously irradiating a plurality of contact holes formed in a first test sample with electron beam having a rectangular cross section, while scanning the electron beam in a scan direction perpendicular to a direction of a longer side of the rectangular cross section, moving the scan position by a distance equal to the longer side length of the electron beam in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the first test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a first current waveform;

simultaneously irradiating a plurality of contact holes in a second test sample in an identical circuit pattern to a circuit pattern of the first test sample with electron beam having a rectangular cross section, while scanning the electron beam in the scan direction, moving the scan position by a distance equal to the diameter of the contact hole in a direction perpendicular to the direction of the longer side of the rectangular cross section, moving the scan position by a distance equal to the longer side length of the electron beam in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the second test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a second current; and

comparing the first current waveform with the second current waveform at identical circuit pattern positions and, when there is a difference exceeding a predetermined value therebetween, extracting coordinates of the positions corresponding thereto.

21. A test method of a semiconductor device, using current generated in a test sample with electron beam irradiation, the test method comprising the steps of:

scanning a first test sample while simultaneously irradiating an area of the first test sample containing a plurality of contact holes, moving the scan position by a distance equal to a diameter of the contact hole in a direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the first test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a first current waveform;

scanning a second test sample while simultaneously irradiating an area of the second test sample containing a plurality of contact holes formed in an identical circuit pattern to a circuit pattern of the first test sample, moving the scan position by a distance equal to the diameter of the contact hole in the direction perpendicular to the scan direction every time when the scan of one line is completed and storing values of current generated in the first test sample when irradiated with electron beam correspondingly to electron beam irradiating positions, as a second current waveform; and

integrating the first and second current waveforms, respectively, comparing an integrated value of the first current waveform with an integrated value of the second current waveform and, when there is a difference exceeding a predetermined value between the integrated values, extracting coordinates of a position corresponding to the difference.

22. A test method of a semiconductor device, using current generated in a test sample with electron beam irradiation, said test method comprising the steps of:

storing values of current generated in a test sample when the test sample is scanned while being irradiated with electron beam correspondingly to electron bean irradiation positions thereof as a current waveform;

integrating current flowing from a rising edge to a falling edge of a pulse contained in the current waveform;

dividing the integrated current by a distance between the rising edge and the falling edge; and

determining the quality of the test sample by comparing the quotient with a preliminarily stored reference value.

23. A test method of a semiconductor device, using current flowing in a test sample with electron beam irradiation, comprising the steps of:

obtaining a first average value by scanning a first test sample by irradiating the first sample with electron beam, storing values of current generated in the first test sample correspondingly to electron beam irradiating positions as a first current waveform, integrating current flown from a rising edge to a falling edge of a corresponding waveform contained in the current waveform and dividing the integrated current by a distance between the rising edge and the falling edge;

obtaining a second average value by scanning a second test sample by irradiating the second sample with electron beam, storing values of current generated in the second test sample correspondingly to electron beam irradiating positions as a second current waveform, integrating current flown from a rising edge to a falling edge of a corresponding waveform contained in the current waveform and dividing the integrated current by a distance

between the rising edge and the falling edge; and

determining the quality of the test sample by comparing the quotient with a preliminarily stored reference value.

24. A test method of a semiconductor device, using current flowing in a test sample with electron beam irradiation, comprising the steps of:

scanning a first test sample by irradiating the first sample with electron beam, storing values of current generated in the first test sample correspondingly to electron beam irradiating positions as a first current waveform and calculating an intermediate position between a rising edge and a falling edge of a corresponding waveform contained in the current waveform as a center position of a contact hole;

scanning a second test sample by irradiating the second sample with electron beam, storing values of current generated in the second test sample correspondingly to electron beam irradiating positions as a second current waveform and calculating an intermediate position between a rising edge and a falling edge of a corresponding waveform contained in the current waveform as a center position of a contact hole; and

comparing the center position of the contact hole of the first test sample with the center position of the contact hole of the second test sample and, when there is a difference larger than a predetermined value, extracting coordinates of a position corresponding thereto.

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